SPECIFICATION CHANGE NOTICE

Date Prepared: February 19, 1999

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THIS NOTICE INFORMS RECIPIENTS THAT THE DOCUMENT IDENTIFIED BY THE NUMBER (AND REVISION LETTER) SHOWN IN BLOCK 4 HAS BEEN CHANGED. THE PAGES CHANGED BY THIS SCN BEING THOSE FURNISHED HEREWITH AND CARRYING THE SAME DATE AS THIS SCN. THE PAGES OF THE PAGE NUMBERS AND DATES LISTED BELOW IN THE SUMMARY OF CHANGED PAGES COMBINED WITH NON–LISTED PAGES OF THE ORIGINAL ISSUE OF THE REVISION SHOWN IN BLOCK 4 CONSTITUTE THE CURRENT VERSION OF THIS SPECIFICATION.

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007	Cover	X		
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	Order of SCN Incorporation SCN 001, 002, 004, 007			

16. Technical Concurrence

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                                        Date

* "S" indicates supersedes earlier page. "A" indicates added page.

Form Date: 8/12/94

International Ground System Specification Document

International Space Station Program

APRIL 26, 1996
Incorporates SCN 007

Russian
Space
Agency

esa
european space agency

Canadian Space
Agency

Agence spatiale
canadienne

agenzia spaziale italiana
(Italian Space Agency)

NASDA
宇宙開発事業団

National Aeronautics and Space Administration
International Space Station Program
Johnson Space Center
Houston, Texas

REVISION AND HISTORY PAGE

REV.	DESCRIPTION	PUB. DATE
–	Initial Release per SSCD 000319, EFF. 09–06–96	09–30–96
	SCN 001 per SSCD 000315, EFF. 11–04–96	11–14–96
	SCN 002 per SSCD 000336, EFF. 08–27–96	11–20–96
	SCN 004 per SSCD 000773, EFF. 03–17–98	03–27–98
	SCN 007 per SSCD 001076R1, EFF. 01–28–99	03–11–99

STATE VECTOR: The state vector is the instantaneous position and velocity of the Space Station related to a specified frame of reference.

STRUCTURE: For the purpose of failure tolerance requirements, the following types of systems/equipment are considered structure: primary structure; secondary structure; pressure vessel structure; micrometeoroid/orbital debris protection; fluid line structure and fittings including heat exchangers; radiation shielding; and cabling including connectors.

TASK TRAINING: Task training is the lowest level of training that performance can be evaluated by a single individual supporting individual Space Station system functions and payloads.

TELEMETRY: Component (ORU, system, etc.) health or status data delivered to the ground from the on–orbit vehicle. Telemetry is down–link only. Telemetry is not uplinked.

TIME TO CRITICALITY: The time between the occurrence of a failure, event or condition and the subsequent occurrence of a hazard or other undesired outcome. Times to criticality will be established by engineering or operational analysis.

USER PAYLOAD: Equipment designed and developed for the purpose of performing research onboard the on–orbit Space Station that is not considered part of the Space Station system.

6.2 Abbreviations and acronyms.

#	Number
%	Percent
A/G	Air–to–Ground
AAC	Aft Access Closure
AIS	Automated Information System
AIT	Analysis and Integration Team
AOS	Acquisition of Signal
APM	Attached Pressurized Module
APMC	Attached Pressurized Module Center

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ASI	Agenzia Spaziale Italiana (Italian Space Agency)
C&DH	Command and Data Handling
C&T	Communications and Tracking
C&W	Caution & Warning
CCC	Consolidated Control Center
CCTV	Closed Circuit Television
CG	Center of Gravity
CGS	Canadian Ground Segment
CHeCS	Crew Health Care System
CI	Contract Item
CI/EI	Configuration Item/End Item
CM	Configuration Management
CMD	Command

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CMILP	Consolidated Maintenance, Inventory And Logistics Planning
CO2	Carbon Dioxide
COTS	Commercial Off The Shelf
CPS	Consolidated Planning System
CSA	Canadian Space Agency
CSCI	Computer Software Configuration Item
CSRD	Columbus System Requirements Document
CTV	Cargo Transport Vehicle
DAM	Diagnostic Acceptability Measure
DRT	Diagnostic Rhyme Test
DV	Delta Velocity
EEE	Electrical, Electronic, and Electromechanical
EMC	Electromagnetic Compatibility
EMR	Electromagnetic Radiation
ESA	European Space Agency
EU	Engineering Unit

EVA	Extravehicular Activity
EVR	Extravehicular Robotics
FCR	Flight Control Room
FDIR	Fault Detection, Isolation and Recovery
FDPA	Flight Dynamics Planning And Analysis
FGB	Functional Cargo Block
FMEA	Failure Mode Effects Analysis
GLSF	General Lab Support Facility
GN&C	Guidance Navigation and Control
GSE	Ground Support Equipment
GSP	Ground Support Personnel
H/W	Hardware
HDBK	Handbook
Hg	Mercury
HOSC	Huntsville Operational Support Center
IAW	In accordance with
ICD	Interface Control Document
IDD	Interface Definition Document
IMS	Inventory Management System
IMV	Intermodule Ventilation
in	inches
in	inch
In.	Inch
IOP	Increment Operations Plan
IP	International Partners
IPCL	Instrumentation Program and Commands List
IPS	Integrated Planning System
IRD	Interface Requirements Document
IRI	International Reference Ionosphere
ISPR	International Standard Payload Rack
ISS	International Space Station
ITS	Integrated Truss Segment
IVA	Intravehicular Activity
JEM	Japanese Experiment Module
JPDRD	Joint Program Definition and Requirements Document
JSC	Johnson Space Center
JSCM	Johnson Space Center Manual
k	kilo
K	Kelvin
kbps	Kilo bites per second
Kg	Kilogram

KSC	Kennedy Space Center
Ku–Band	15.250 to 17.250 Gigahertz

lbs	pounds
lbf	pounds force
Lbm	pounds mass
LOS	Loss of Signal
LRU	Line Replaceable Unit
LSE	Launch Support Equipment

m	meters
m	milli
m	meter
MBF	Mission Build Facility
Mbps	Mega bits per second
MCC	Mission Control Center
MDM	Multiplexer Demultiplexer
MDS	Meteoroid Debris Shield
MIL	Military
MMD	MSS Maintenance Depot
MOD	Mission Operations Directorate
MPE	Maximum Permissible Exposure
MPLM	Mini–Pressurized Logistics Module
MPSR	Multi–Purpose Support Room
MRCS	MSS Robot Control Station
MRMDF	Multiple Remote Manipulator Development Facility
MSC	Mobile Servicing Centre
MSFC	Marshall Space Flight Center
MSS	Mobile Servicing System
MTSC	MPLM Technical Support Center

N	Newtons
N/A	Not Applicable
NA	Not Applicable
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan
NBL	Neutral Buoyancy Laboratory
NHB	NASA Handbook
NSTS	National Space Transportation System
NTSC	National Television Systems Committee

OPHX	Orbiter Payload Heat Exchanger
ORU	Orbital Replacement Unit
OSTP	On–Board Short Term Plan

PAO	Public Affairs Office
PDAC	Procedures Development and Control

PDL	Payload Data Library	
PDSS	Payload Data Services System	
PHC	Permanent Human Capability	
PI	Principal Investigator	
PICF	Payload Integration and Checkout Facility	
PIDS	Prime Item Development Specification	
PIM	Payload Information Management	
	Planning Information Management	
POIC	Payload Operations Integration Center	
POIF	Payload Operations Integration Facility	
POST	Power On Self Test	
PPS	Payload Planning System	
psia	pounds per square inch absolute	
PSIV	Payload Software Integration and Verification	
PTC	Payload Training Center	
PTT	Part Task Trainer	
Rev	Revision	
RGS	Russian Ground Segment	
ROS	Russian Orbital Segment	
RS	Russian Segment	
RSA	Russian Space Agency	
RSGF	Rigidized Sensing Grapple Fixture	
RUPSM	Resource Utilization, Planning And Systems Model	
S/W	Software	
S–Band	1550 to 5200 Megahertz	
Sensitive		
SES	System Engineering Simulator	
SODF	Systems Operations Data File	
SPDM	Special Purpose Dextrous Manipulator	
SRMS	Shuttle Remote Manipulator System	
SSCC	Space Station Control Center	
SSI	Space Station Integration	
SSIPC	Space Station Integrated Promotion Center	
SSIPC	Space Station Integration and Promotion Center	
SSMB	Space Station Manned Base	
SSMTF	Space Station Mock–up Training Facility	
SSP	Space Station Program	
SSRMS	Space Station Remote Manipulator System	
SSTF	Space Station Verification and Training Facility	

STD	Standard
STP	Short Term Plan
SVF	Software Verification Facility
TBD	To Be Determined
TCATS	Trajectory, Command, Analysis and Timeline System
TDRS	Tracking and Data Relay Satellites
TDRSS	Tracking and Data Relay Satellite Systems
TLM	Telemetry
TSC	Telescience Support Center

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TV	Television
UDFR	User Detailed Functional Requirements
UL	Underwriters Laboratory
UOF	User Operations Facility
US	United States
USGS	United States Ground Segment
USOC	United States Operations Center
USOS	United States On–Orbit Segment
Vdc	Volts direct current
Vol.	Volume

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| WETF | Weightless Environment Training Facility |
| WSC | White Sands Complex |

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A3.7.1.3.3 Provide data for uplink.

A3.7.1.3.3.1 Acquire data for uplink.

The CGS shall provide for the acquisition of MSS data intended for uplink.

A3.7.1.3.3.2 Prepare data for uplink to on–orbit station.

The CGS shall prepare MSS data for uplink.

The CGS shall comply with security and privacy requirements developed by the ISSA Program Office for transmission of data for uplink.

A3.7.1.3.3.3 Transmit data for uplink.

The CGS shall transmit MSS data intended for uplink to the Ground Communication System external interface.

A3.7.1.3.4 Support downlinked data.

A3.7.1.3.4.1 Receive downlinked data.

The CGS shall provide for the receipt of data from the Ground Communications System external interface.

A3.7.1.3.4.2 Record downlinked data.

The CGS shall provide for the recording of downlinked MSS data.

A3.7.1.3.4.3 Archive recorded flight–ground data.

The CGS shall provide for the archival of downlinked MSS data.

A3.7.1.3.4.4 Playback recorded flight–ground data.

The CGS shall provide for the playback of recorded or archived MSS data.

The CGS shall comply with security and privacy requirements developed by the ISSA Program Office for transmission of downlinked data.

A3.7.1.3.5 Perform task training.

A3.7.1.3.5.1 Perform Space Station system task training.

The CGS shall provide training devices or facilities for the preparation and conduct of space station systems task training for up to six flights per year.

A3.7.1.3.5.2 Perform payload task training.

The CGS shall provide training devices or facilities for the preparation and conduct of payload task training for up to six flights per year.

A3.7.1.3.6 Perform functional training.

A3.7.1.3.6.1 Perform Space Station system functional training.

The CGS shall provide training devices or facilities for the preparation and conduct of space station system functional training for up to six flights per year.

A3.7.1.3.6.2 Perform payload functional training.

The CGS shall provide training devices or facilities for the preparation and conduct of payload functional training for up to six flights per year.

A3.7.1.3.7 Perform operations training.

A3.7.1.3.7.1 Perform NASA operations training.

The CGS shall provide training devices or facilities for the preparation and conduct of National Aeronautics and Space Administration (NASA) operations training for up to six flights per year.
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A3.7.1.3.7.2 Perform international partner operations training.

CGS shall provide training devices or facilities for the preparation and conduct of International Partner operations training for up to six flights per year.

A3.7.1.3.8 Preliminary procedures.

A4.3.4 Computer resource requirements.

A4.3.5 Logistics.

A4.3.6 Personnel and training.

A4.3.7 Characteristics of major functional elements.

A4.3.7.1 Canadian Ground Segment.

A4.3.7.1.1 Purpose.

A4.3.7.1.2 Description.

A4.3.7.1.3 Capabilities.

A4.3.7.1.3.1 Space Station system performance analysis.

A4.3.7.1.3.1.1 Analyze operations performance.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS analysis hardware, software, and facilities are capable of performing operations performance analysis. Verification shall be considered successful when analysis results show that CGS is capable of analyzing operations performance of MSS for continuous operations.

A4.3.7.1.3.1.2 Manage station configuration.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS configuration hardware, software, and facilities are capable of supporting MSS configuration management. The verification shall be considered successful when analysis results show that CGS is capable of accurately maintaining a record of MSS configuration and
 providing MSS configuration inputs to the Space Station Control Center (SSCC).

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A4.3.7.1.3.1.3 Manage station maintenance.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS configuration hardware, software, and facilities are capable of supporting MSS maintenance management. The verification shall be considered successful when analysis results show that CGS is capable of providing MSS maintenance inputs to SSCC.

A4.3.7.1.3.2 Support on–orbit operations.

A4.3.7.1.3.2.1 Monitor and assess on–orbit operations.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS hardware, software, and facilities are capable of performing on–orbit operations. Verification shall be considered successful when analysis results show that CGS is capable of determining on—orbit MSS operations status and supporting operations development for continuous operations.

A4.3.7.1.3.2.2 Execute on–orbit station operations.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS hardware, software, and facilities are capable of generating MSS commands and data for uplink. Verification shall be considered successful when analysis results show that CGS is capable of providing SSCC with MSS commands and data for continuous operations.

A4.3.7.1.3.2.3 Execute ground operations.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS hardware, software, and facilities are capable of receipt and transmission of communications supporting MSS ground operations coordination. Verification shall be considered successful when analysis results show that CGS is capable of ground operations coordination communications for continuous operations.

A4.3.7.1.3.3 Provide data for uplink.

A4.3.7.1.3.3.1 Acquire data for uplink.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS hardware, software, and facilities are capable of acquiring MSS data for uplink. Verification shall be considered successful when analysis results show that CGS is capable of acquisition of MSS commands and data intended for uplink.

A4.3.7.1.3.3.2 Prepare data for uplink to on–orbit station.

An analysis shall be performed based upon data obtained from CGS operational simulations to verify that CGS hardware, software, and facilities are capable of preparing MSS data for uplink. Verification shall be considered successful when analysis results show that CGS is capable of preparing acquired MSS commands and data for transmission to the ground communications system external interface.

D3.1.5.1.1.1.2.3 SSIPC shall receive activity status from SSCC of any JEM related file or data transfers to and from SSCC and ISS.

D3.1.5.1.1.1.3 Telemetry

D3.1.5.1.1.1.3.1 SSIPC shall receive unprocessed JEM system telemetry, extracted from the ISS S–band downlink, from the SSCC

D3.1.5.1.1.1.3.2 SSIPC shall select real–time, ISS processed telemetry to be received from the SSCC.

D3.1.5.1.1.1.4 Archived Data

D3.1.5.1.1.1.4.1 SSIPC shall receive access to SSCC archived files that are less than 24 hours old within 5 minutes of receipt of the request.

D3.1.5.1.1.1.4.2 SSIPC shall receive access to SSCC archived files that are greater than 24 hours and less than 1 year old within 30 minutes of the request.

D3.1.5.1.1.1.4.3 SSIPC shall receive access to archived files that are greater than 1 year old within 24 hours of the request.

D3.1.5.1.1.1.4.4 SSIPC shall receive from SSCCcommand histories of all core system commands uplinked to ISS to facilitate the maintenance of a complete record of all operations transactions with ISS.

D3.1.5.1.1.1.5 Joint Integrated Simulation

D3.1.5.1.1.1.6 Voice Requirements

D3.1.5.1.1.1.6.1 SSIPC shall receive talk/monitor capability on ISS and Space Shuttle space–to–ground voice links, from SSCC.

D3.1.5.1.1.1.6.2 SSIPC shall receive talk/monitor capability on SSCC ground voice loops.
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D3.1.5.1.1.1.7 Video Requirements

D3.1.5.1.1.1.7.1 SSIPC shall receive from the SSCC, ISS and Shuttle Video distribution services.

D3.1.5.1.1.1.7.2 SSIPC shall receive from the SSCC selected downlink video upon request.

D3.1.5.1.1.1.7.3 SSIPC shall provide video conference capabilities for off–line coordination with SSCC.

D3.1.5.1.1.2 IPS Interface Description

The SSIPC shall provide the capability to exchange preliminary and final planning and procedures data with the IPS during both preincrement and near real–time operations. This interface is specified in SSP45012.

D3.1.5.1.1.3 HOSC Interface Description

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SSIPC and POIC/Payload Data Services System (PDSS) shall provide the capability to exchange

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ground voice, planning data, operations data, and payload data for on–orbit and simulation/test support. This interface is specified in SSP 45025.

D3.1.5.1.1.3.1 Payload Data

D3.1.5.1.1.3.1.1 SSIPC shall receive Japanese payload data and JEM partner payload health and status data from the PDSS in real time.

D3.1.5.1.1.3.1.2 SSIPC shall provide the capability to request and receive stored Japanese payload data and JEM partner payload health and status from PDSS

D3.1.5.1.1.3.2 Ground Audio/Video

D3.1.5.1.1.3.2.1 POIC and SSIPC shall provide a video data communications function for video conference between the POIC and SSIPC.

D3.1.5.1.1.3.2.2 POIC and SSIPC shall provide the talk/monitor capability on POIC/PDSS ground voice loops.

D3.1.5.1.1.3.3 Operations Data

SSIPC shall provide the capability to receive/transmit operations execution data with the POIC.

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TABLES

FIGURES

SSP 45001　　　　　SSCC to HOSC ICD
Rev. Basic

SSP 45004　　　　　SSCC to CSA Ground Segment ICD
Rev. Basic

SSP 45011　　　　　SSCC to ESA Ground Segment ICD
Rev. Basic

SSP 45012　　　　　SSCC to NASDA Ground Segment ICD
Rev. Basic

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SSP 45024　　　　　HOSC to CSA Gateway ICD
Rev. Basic

SSP 45025　　　　　HOSC to NASDA Gateway ICD
Rev. Basic

SSP 45026　　　　　HOSC to ESA Gateway ICD
Rev. Basic

SSP 50039　　　　　SSPF to MBF ICD
Rev. Basic

SSP 50041　　　　　SSCC to MBF ICD
Rev. Basic

SSP 50043　　　　　IPS to PSIV ICD
Rev. Basic

SSP 50045　　　　　MBF to PSIV ICD
Rev. Basic

SSP 50046　　　　　MBF to POIC ICD
Rev. Basic

SSP 50047　　　　　PSIV to SVF ICD
Rev. Basic

SSP 50057 Rev. Basic	SSCC to RSA Ground Segment ICD
SSP 50067 Rev. Basic	SSTF to ESA Ground Segment ICD
SSP 50068 Rev. Basic	SSTF to NASDA Ground Segment ICD
SSP 50069 Rev. Basic	SSTF to RSA Ground Segment ICD
SSP 50070 Rev. Basic	SSTF to SMTF ICD
SSP 50071 Rev. Basic	SSTF to WETF ICD
SSP 50072 Rev. Basic	SSCC to SSTF ICD
SSP 50073 Rev. Basic	SSTF to IPS ICD
SSP 50074 Rev. Basic	SSMTF to SSTF ICD
SSP 50077 Rev. Basic	PDSS to Generic User ICD
SSP 50078 Rev. Basic	SSCC to Generic User ICD
SSP 50079 Rev. Basic	MBF to SVF ICD
SSP 50080 Rev. Basic	IPS to Sustaining Engineering Facilities ICD
SSP 50081 Rev. Basic	Sustaining Engineering Facilities to MBF ICD

SSP 50082 Rev. Basic	SSCC to International Search and Rescue ICD
MSFC TBD Basic	PDSS to POIC ICD
SSP 50084 Rev. Basic	SSTF to NBL ICD
SSP 50085 Rev. Basic	MBF to SSTF ICD
SSP 50086 Rev. Basic	PSIV to PTC ICD
SSP 50087 Rev. Basic	PSIV to PICF ICD
SSP 50088 Rev. Basic	PDSS to PTC ICD
SSP 50089 Rev. Basic	MBF to ESA Ground Segment ICD
SSP 50090 Rev. Basic	PSIV to POIC ICD
SSP 50091 Rev. Basic	MBF to NASDA Ground Segment ICD
SSP 50092 Rev. Basic	MBF to CSA Ground Segment ICD
SSP 50305	POIC to Generic User Interface Definition Document

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(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111–5094.)

F2.1.2 Other Government documents, drawings, and publications.

JSC 13196 TBD	IPS Functional Subsystem (Platform Level B) Requirements
JCS 13325 TBD	SSCC Procedures Development and Control (PDAC) Subsystem Functional Requirements
JSC 13347 TBD	SSCC TCATS Maintenance, Inventory and Logistics Planning Subsystem Functional Requirements
JSC 13350 TBD	IPS Consolidated Planning System (CPS) Subsystem Functional Requirements
JSC 13419 TBD	IPS Flight Dynamics Planning and Analysis (FDPA) Subsystem Functional Requirements
JSC 13522 TBD	IPS Resource Utilization Planning and System Modeling (RUPSM) Subsystem Functional Requirements
JSC 13565 TBD	Integrated Planning System Level A Requirements
JSC 24454 TBD	Space Station Training Facility User Detailed Functional Requirements
JSC 35500 TBD	Institutional Robotics Requirements
JSCM 1700.D (January 1985)	NASA JSC Safety Manual
KHB 1700.7B (September 1992)	KSC Payload Ground Safety Handbook
MM 1700.4C (December 1983)	NASA MSFC Safety and Environmental Health
MSFC–PLAN–904 TBD	Cross–Functional Requirement Implementation Plan

MSFC–RQMT–1440 TBD	Generic Requirements for the Enhanced HOSC System
MSFC–SPEC–2123 TBD	PDSS Development Specification
MSFC–STD–1274, Vol. 2	MSFC HOSC Telemetry Format Standard, Volume 2
MSFC–STD–2535	MSFC HOSC Command Format Standard

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NHB 2410.9A (June 1993)	NASA Automated Information Security Handbook
NHB 5300.4 (3A.1) (June 1, 1986)	Requirements for Soldered Electrical Connections
NHB 5300.4 (3G) (April 1, 1985)	Requirements for Interconnecting Cables, Harnesses and Wiring
NHB 5300.4 (3H) (May 1, 1984)	Requirements for Crimping and Wire–Wrap
NHB 5300.4 (3I) (June 26, 1990)	Requirements for Printed Wiring Board
NHB 5300.4 (3J) (April 1, 1985)	Requirements for Conformal Coating and Staking of Printed Wiring Boards and Electronic Assemblies
NHB 5300.4 (3K) (January 7, 1985)	Design Requirements for Rigid Printed Wiring Board and Assemblies
OD–13 TBD	PTC Requirements Document
S683–35451 TBD	Payload Software Integration and Verification Prime Item Development Specification
SW683–70256–1 TBD	Payload Planning System Software Product Document System Specification

      S684–10141   Prime Item Development Specification – Mission Build
      TBD   Facility

F2.2 Non–Government documents.

The following documents of the exact issue shown form a part of this specification to the extent specified herein. In the event of a conflict between the documents referenced herein and the contents of this specification, the contents of this specification shall be considered a superseding requirement.

      ANSI–S3.2–1989   American National Standards Method for Measuring The
                              (Section 8.6) Intelligibility Of Speech Over Communications
                              Systems

(Non–Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

F2.3 Order of precedence.

In the event of a conflict between the text of this specification and the references cited herein, the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

F3.1.5 Interface requirements.

This section identifies those interfaces of the USGS, both internal and external, which will be controlled by the Program Office. More interfaces may exist than are identified in this document, but they will be controlled by the developing organizations.

F3.1.5.1 External interfaces.

The following subparagraphs identify the external interfaces of the USGS. The USGS external interface diagram is shown in Figure F–1. The diagram identifies the following types of information interfaces between the USGS and external facilities and systems:

A.   Data Downlink – Data generated onboard the on–orbit Space Station and transmitted to the ground as telemetry. Data downlink may include payload health and status, science data, medical data, ancillary data, and core systems data. This interface also includes the downlink of onboard data files and command responses. Data downlink may also be identified as Simulation data downlink in support of training or Verification data downlink in support of testing.

B.   Commands – Commands generated on the ground destined for the on–orbit Space Station. Command uplink includes payload commands and core system commands. This interface also includes the uplink of data files to the on–orbit Space Station. Commands may also be identified as Simulation commands in support of training or Verification commands in support of testing.

C.   Air–to–Ground (A/G) Video – Video generated onboard the on–orbit Space Station and transmitted to the ground.

D.   Air–to–Ground (A/G) Audio – Audio communications between the on–orbit Space Station and the ground in support of on–orbit operations including private A/G audio for medical information. A/G audio may also be identified as Simulation A/G audio in support of training.

E.   Audio – Audio communications between ground facilities in support of ground functions and training.

F.   Video – Video communications between ground facilities in support of ground functions. Video may include recorded video playback, video teleconferencing, or video required for training.

G.   Flight Software – Software source code and data to be resident in onboard processors. Flight software is designed as core systems or payload software.

H.   Planning and Procedures – Planning and procedures data required for real–time operations support or pre–increment preparations between facilities in support of ground functions.

F3.1.5.1.1 Payload operations facilities external interface description.

Payload operations facilities and equipment required to communicate with and control their respective payloads will interface with the USGS. These interfaces are defined in SSP 50305,

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POIC to Generic User Interface Definition Document. The following diagrams depict the data flows for utilization onboard the ISS. The data flows are shown separately for clarity.
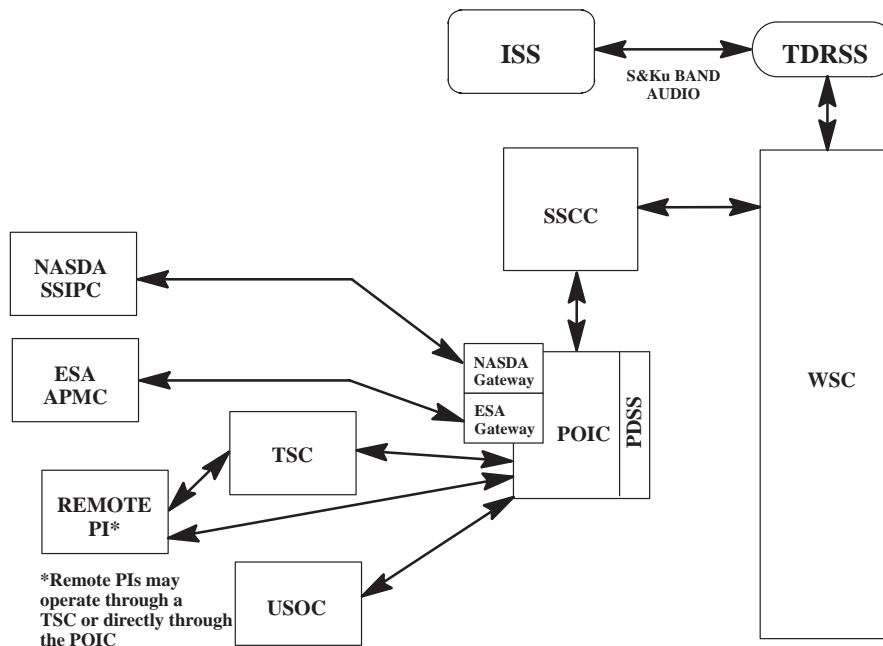
ISS Payload A/G Audio Flow

Payload related A/G audio is routed through the POIC as shown in the above diagram.
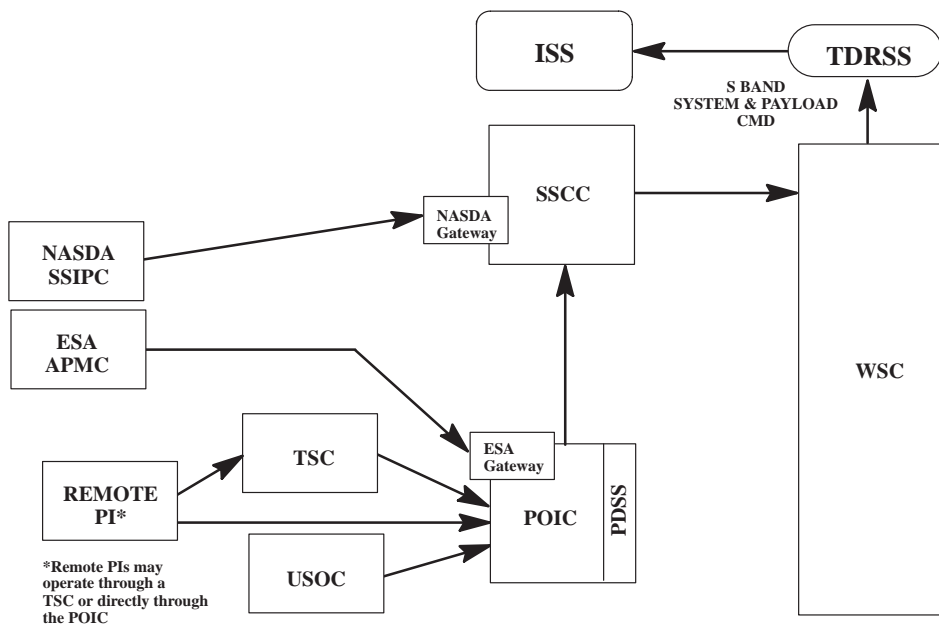
ISS Payload Command Data Flow

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Payload related uplinks (CMD and File) to the ISS go through the SSCC. Hazardous CMD checks and source and destination validation are performed in the POIC and the SSCC. Payload uplinks are routed as shown in the above diagram.
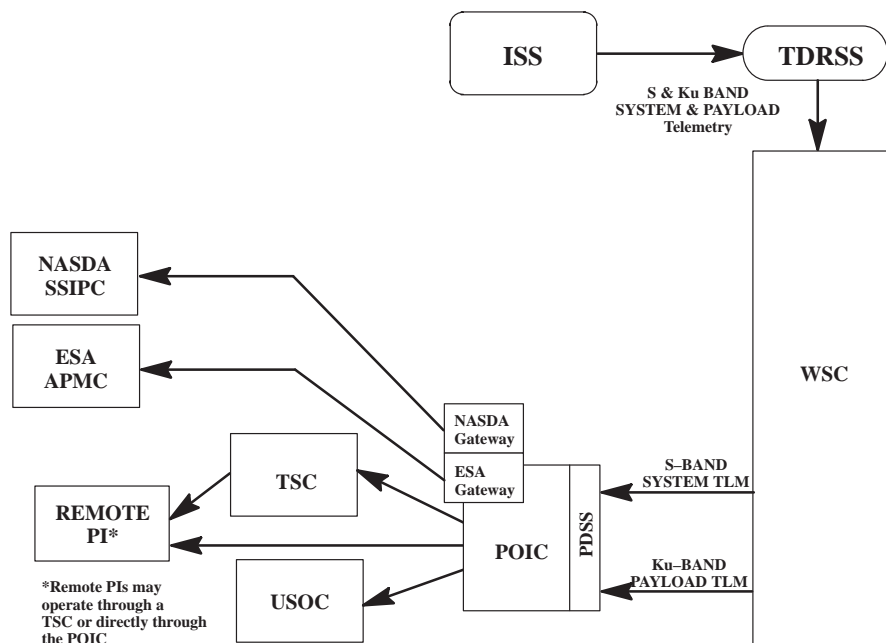
ISS Payload Telemetry Flow

Payload data contained in the Ku–band stream, and the health and status data in the S–band stream are sent through the TDRSS and White Sands Complex (WSC) and received by the PDSS. Science data, health and status data, and ancillary data is routed to the POIC, Telescience Support Centers (TSCs), Remote Sites, USOC, and the IP gateways at Marshall Space Flight Center (MSFC) as shown in the above diagram.
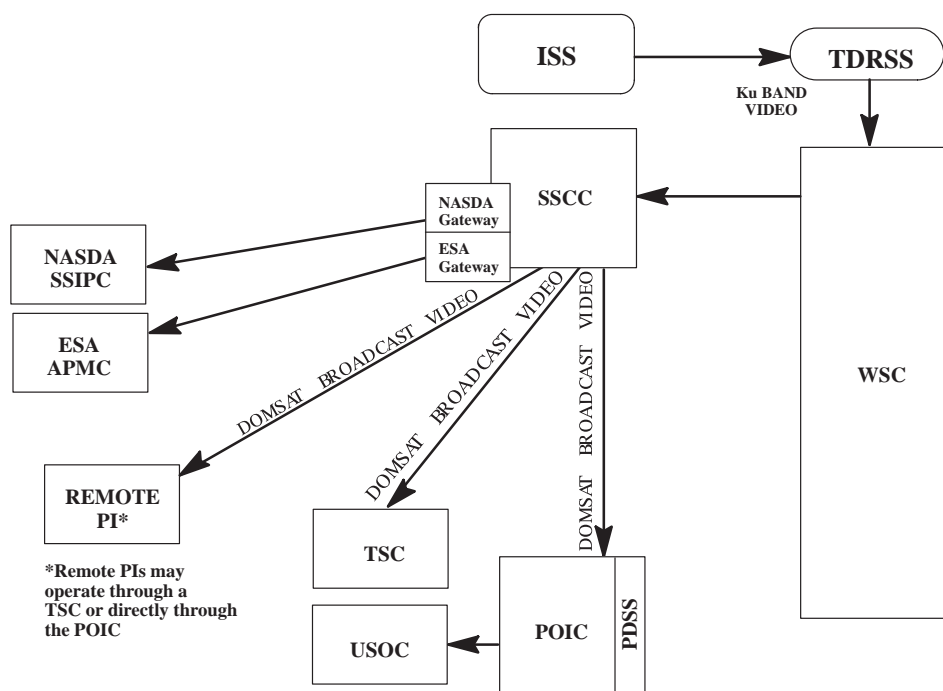
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ISS Payload A/G Video Flow

The ISS Payload A/G video data stream is processed by JSC TV and distributed to the POIC, TSCs, Remote Sites, and the IP gateways at JSC as shown in the above diagram.

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F3.1.5.1.2 NASA communications system external interface description.

The NASA communications system (NASCOM) will interface with the USGS to provide all ground–ground and ground–on–orbit ISS communication. NASCOM will relay commands and data to the TDRSS for uplink to the ISS. The NASCOM communication system will also

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interface with the USGS for the downlink of payload and system status data, audio, video, and payload science data. The USGS to NASCOM communications system interface is defined in ICD SSP 41154, ICD SSP 41158, ICD SSP 42104, ICD SSP 42105, and ICD SSP 42018. NASCOM also provides the ground to ground communication implementation for the appropriate internal interfaces specified in 3.1.5.2.

F3.1.5.1.3 Canadian Space Agency external interface description.

The Canadian Space Agency (CSA) ground segment will interface with the USGS to exchange audio and operations data, receive data and video, and send payload commands and files. This interface is defined in ICD SSP 45004, ICD SSP 50092 and ICD SSP 45024.

F3.1.5.1.4 European Space Agency external interface description.

The European Space Agency (ESA) ground segment will interface with the USGS to exchange audio and operations data, receive data and video, and send payload commands and files. This interface is defined in ICD SSP 45011, ICD SSP 50089 and ICD SSP 45026.

F3.1.5.1.5 NASDA JEM Ground System external interface description.

The National Space Development Agency of Japan (NASDA) ground segment will interface with the USGS through jointly agreed to gateways to exchange audio and operations data, receive data and video, and send commands and files. This interface is defined in ICD SSP 45012, ICD SSP 50091, and ICD SSP 45025.

F3.1.5.1.5.1 SSCC to SSIPC interface description.

SSCC and Space Station Integration and Promotion Center (SSIPC) shall provide the capability to exchange voice including air–to–ground voice, planning data, and operations data, to receive ISS and JEM system data, video including air–to–ground video, to send command, flight software, and file for JEM system and payloads. This interface is shown in figure F–1 and is specified in SSP 45012.

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F3.7.2.4.3 Execute ground operations.

A.   The POIC shall provide for obtaining data and procedures required for payload operations from ground facilities and data sources.

B.   The POIC shall provide ground–to–ground audio communications to support integrated ground core/payload operations.

C.   The POIC shall provide ground–to–ground audio communications to support integrated payload operations.

D.   The POIC shall provide ground–to–ground audio communications to support integrated payload/user operations.

F3.7.2.5 Provide data for uplink.

F3.7.2.5.1 Acquire data for uplink.

The POIC shall provide for the acquisition of payload and payload support systems data from sources both internal and external to the POIC in accordance with ICDs SSP 42018, 45024, 45025, 45026, and IDD 45023

F3.7.2.5.2 Transfer data intended for on–orbit Space Station.

A.   The POIC shall provide for the transfer to the SSCC (in accordance with ICD SSP 45001) of payload and payload support systems data intended for uplink from sources both internal and external to the POIC.

B.   The POIC shall provide for the transfer to the SSCC of planning products for the on–orbit space station.

C.   The POIC shall verify that only authorized user payload commands are transmitted to the SSCC for uplink to the on–orbit station or payload.

D.   The POIC shall verify that only authorized hazardous commands are transmitted to the SSCC for uplink to the on–orbit station or payload.

E.   The POIC shall provide for the transfer of files to the SSCC for uplink to the on–orbit space station or payload.

F3.7.2.6 Support Downlink Data.

F3.7.2.6.1 Receive Downlink Data.

A.   The POIC shall receive core systems, flight ancillary, and payload health and status telemetry in accordance with ICDs SSP 41154, 41158, 42018.

B.   The POIC shall receive audio and video from the SSCC in accordance with ICD SSP 45001.

C.   The POIC shall monitor received telemetry data quality.

D.   The POIC shall receive up to 192 kbps of S–band core systems data for monitoring and display to the ground controllers.

E.   The POIC shall receive up to 256 kbps of Ku–band payload health and status data for monitoring and display to the ground controllers.

F.   The POIC shall receive up to 4 channels of video data simultaneously.

F3.7.2.6.2 Prepare downlinked data for ground use.

A.   The POIC shall process core telemetry, payload health and status data, and flight ancillary data for internal distribution.

B.   The POIC shall process up to 192 kbps of core telemetry data for monitoring and display to ground controllers.

C.   The POIC shall process up to 256 kbps of payload health and status data for monitoring and display to ground controllers.

D.   The POIC shall process payload health and status data formatted in accordance with MSFC–STD–1274, Vol. 2, MSFC HOSC Telemetry Format Standard Volume 2.

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F3.7.2.6.3 Convert data for external ground interfaces.

The POIC shall provide for the generation of ground ancillary data.

F3.7.2.6.4 Distribute data on ground.

A..   The POIC shall provide for the distribution of payload commands, simulated payload commands, planning data, and audio to destinations both internal and external to the POIC as specified in the applicable ICD SSP 45001.

B.   The POIC shall provide for the distribution of ground ancillary data to the PDSS in accordance with SSP 50083 ICD.

F3.7.2.13 Deliver final procedures.

F3.7.2.13.1 Produce physical final procedure products.

The POIC shall provide the capability for the user to produce payload physical procedure products such as checklists for real–time ground operations procedures, on–orbit automated procedures, and on–orbit manual procedures.

F3.7.2.13.2 Retrieve and deliver electronic final procedure products.

A.   The POIC shall provide the capability for the user to retrieve electronic payload procedure files from storage and transmit them to ground segment facilities.

B.   The POIC shall provide for the transmission of flight procedure files to the SSCC for uplink.

F3.7.3 United States Operations Center (USOC).

F3.7.3.1 Purpose.

The USOC will provide users with a host payload operations location in proximity with the POIC. The USOC will provide, to users who locate there, a capability for audio, video, and limited data processing services to monitor and command their payloads. USOC users will be able to access PDSS–provided data services. They will also have access to POIC data processing and display services, as well as PPS services to support user operations planning. USOC users may also interface with another UOF or a remote user location.

F3.7.3.2 Description.

The USOC facility is in close proximity to the POIC and is designed to utilize the generic services and interfaces offered by the POIC and the PDSS. It contains user workstations, user work areas, and user conference areas in support of real–time, training and simulated operations of on–orbit payloads. The USOC provides the capability for the user to interface electronically with other appropriately equipped user operations facilities.

F3.7.3.3 Support on–orbit operations.

F3.7.3.3.1 Monitor and assess payload operations.

A.   The USOC shall provide for the determination of payload operations status.

B.   The USOC shall provide tools for the user to perform comparison of payload operations status with projected operations status.

C.   The USOC shall display up to 4 channels of video data.

F3.7.3.3.2 Execute payload operations.

A.   The USOC shall provide for ground based commanding of payload operations.

B.   The USOC shall provide for the generation of payload data files for uplink to the on–orbit Space Station.

C.   The USOC shall provide for audio communications between flight crew and ground controller personnel in support of payload operations.

D.   The USOC shall provide the capability for the user to initiate user payload commands.

F3.7.3.3.3 Execute ground operations.

The USOC shall provide the capability for ground to ground audio communications required to provide for ground operations coordination of payload operations.

F3.7.3.4 Support downlinked data.

F3.7.3.4.1 Receive downlinked data.

A.   The USOC shall receive up to 256 kbps of Ku–band payload health and status data for monitoring and display to ground controllers.

B.   The USOC shall receive up to 50 Mbps of payload data for routing to user ground support equipment.

C.   The USOC shall receive up to 4 channels of video data.

F3.7.3.4.2 Prepare downlinked data for ground distribution.

A.   The USOC shall provide distribution of payload related data and video within the USOC.

B.   The USOC shall provide the capability to process payload, experiment, and instrument data, including telemetry formatted in accordance with MSFC HOSC Telemetry Format Standard, Volume 2.

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F3.7.3.5 Perform task training.

F3.7.3.5.1 Perform payloads task training.

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E.   Proficiency training.

F.   Remote POIC cadre support of integrated training sessions.

G.   Integrate simulation between PTC and POIC.

H.   Joint integrated simulations between PTC, SSCC, and POIC.

I.   Payload joint integrated simulations between PTC, SSCC, and POIC.

F3.7.16.5.2 Perform international partner operations training.

The PTC shall provide hardware, software, and connectivity to other NASA facilities to support the preparation and conduct of international partner operations training.

F3.7.17 Payload Integration and Checkout Facility (PICF).

F3.7.17.1 Purpose.

The PICF is used for processing of U.S. payloads including physical integration and interface checkout.

F3.7.17.2 Description.

The PICF is designed to provide a generic set of services required to support U.S. payload processing including the physical integration of experiments to program–approved carriers, and the interface testing of integrated experiments with a high–fidelity simulator.

F3.7.17.3 Provide ground–based physical integration for payloads.

The PICF shall provide the capability to perform physical payload integration of a payload into program provided payload carriers.

F3.7.17.4 Provide ground–based interface checkout for payloads.

A.   The PICF shall provide the capability to perform ground–based interface checkout of User payloads to payload carriers.

B.   The PICF shall provide the capability to perform ground–based interface checkout of integrated payload carriers (incl. payloads) to a simulator of the on–orbit space station.

C.   The PICF shall provide the capability to simulate POIC commands and control interfaces for payload ground–based checkout of integrated payloads.

D.   The PICF shall provide the capability to receive User payload software, payload commanded data definition files according to protocol in PSIV to PICF ICD SSP 50087.

E.   The PICF shall provide the capability to receive User payload software, payload commanded data definition files according to protocol in MBF to SSPF ICD SSP 50039.

F3.7.18 Telescience Support Centers.

F3.7.18.1 Purpose.

The TSC will provide facility class payload and other ISS users access to audio, video, command and data processing services to enable them to conduct payload operations. The TSC may also provide remote users with access to services as required to support their payload or experiment operations.

F3.7.18.2 Description.

The TSC is a NASA funded facility which provides the capability to plan and operate on–orbit facility class payloads and experiments, other payloads and experiments, and instruments. The TSC processes and analyzes engineering data, processes science data, and distributes data to its associated local and remote user community. The TSC resources and capabilities include the facility, hardware, software, operations, maintenance, engineering, communications, and systems required to support ISS payload operations, control, and planning.

F3.7.18.3 Support on–orbit payload operations.

F3.7.18.3.1 Monitor and assess payload operations.

A.   The TSC shall provide the capability to monitor the real–time operational status of facility class payloads and experiments, other payloads and experiments, and instruments associated with the TSC.

B.   The TSC shall provide access to tools to enable limit checking and exception monitoring of payload health and status data.

C.   The TSC shall provide access to tools to receive and display payload and experiment caution and warning data.

F3.7.18.3.2 Execute payload operations.

A.   The TSC shall provide the capability to perform ground based commanding of facility class payloads and experiments, other payloads and experiments, and instruments in accordance with SSP 50305 and MSFC–STD–2535, MSFC HOSC Command Format Standard.

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B.   The TSC shall provide the capability to generate payload data files for uplink to the on–orbit ISS.

C.   The TSC shall provide the capability for audio communication between flight crew and ground controller personnel in support of payload operations.

D.   The TSC shall provide the capability to receive and distribute ISS video to internal customers and selected external remote user facilities.

F3.7.18.3.3 Execute ground operations.

A.   The TSC shall provide the capability for ground to ground audio communication for coordination of payload operations.

B.   The TSC shall provide the capability for video conferencing for planning of payload operations.

C.   The TSC shall provide the capability for teleconferencing among the POIC, local users, and remote users.

F3.7.18.4 Support data.

F3.7.18.4.1 Receive data.

A.   The TSC shall provide the capability to receive Ku–band data for the specific payloads, experiments, and instruments associated with the TSC from PDSS in accordance with SSP 50305.

B.   The TSC shall provide the capability to receive required POIC generated data in support of payload operations.

C.   The TSC shall provide the capability to receive ISS video from the SSCC video distribution function (Bldg 8, JSC TV).

F3.7.18.4.2 Prepare data for ground use.

A.   The TSC shall provide the capability to process Ku–band data for the specific payloads, experiments, and instruments associated with the TSC.

B.   The TSC shall provide the capability to process POIC generated data.

C.   The TSC shall provide the capability to process payload, experiment, and instrument data, including telemetry formatted in accordance with MSFC–STD–1274, Vol. 2.

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F3.7.18.4.3 Distribute data on ground.

The TSC shall provide the capability to distribute processed Ku–band and POIC generated data to destinations both internal and external to the TSC.

F3.7.18.4.4 Store data on ground.

The TSC shall provide the capability to store processed data for a minimum of three months.

F3.7.18.5 Perform operations training.

A.   The TSC shall provide the capability to conduct local operations training, integrated payload training, and joint multi–segment training.

B.   The TSC shall maintain separation between training and real–time operations.

C.   The TSC shall provide the capability to support simultaneous training and real–time operations.

F3.7.18.6 Perform training and certification.

A.   The TSC shall provide training and certification of local and remote users on the use of TSC provided mission support services.

B.   The TSC shall certify all operators in accordance with Document # TBD, Payload Ground Support Personnel Training and Certification Plan.

F3.7.18.7 Access to mission support services.

A.   The TSC shall provide the capability to access pre–increment planning tools, e.g., PPS, Payload Data Library (PDL), OZ Homepage, Payload Operations Integration Facility (POIF) homepage.

B.   The TSC shall provide the capability to access POIC provided mission support services.

F3.7.18.8 Security.

A.   The TSC shall provide the capability to insure that the remote user interface to the TSC is protected from unauthorized access in accordance with security requirements contained in SSP 50305.

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B.   The TSC shall provide the capability to protect their assets in accordance with applicable government security rules and regulations, local security requirements, and the security requirements contained in SSP 50305.

C.   The TSC shall satisfy the security interface requirements contained in SSP 50305.

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F3.8 Precedence.

The order of precedence for the requirements paragraphs in this document is as follows:
        3.2.1.x
        3.7.x
        3.3.x
        3.2.3 through 3.2.7
        3.4, 3.5.x, 3.6.x

Paragraphs 3.1.x are informational and do not contain mandatory requirements.

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F.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.2.6.2 Prepare downlinked data for ground use.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

C.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

D.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–STD–1274, Vol. 2) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

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F4.3.7.2.6.3 Convert data for external ground interfaces.

This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.2.6.4 Distribute data on ground.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.2.6.5 Record downlinked data.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the POIC end item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.2.6.6 Playback recorded flight–ground data

This requirement shall be verified by analysis. An analysis shall be performed of the POIC and item specification (MSFC–PLAN–904) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

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requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.3.4 Support downlinked data.

NA

F4.3.7.3.4.1 Receive downlinked data.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

C.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.3.4.2 Prepare downlinked data for ground distribution.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the

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USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–STD–1274, Vol. 2) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

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F4.3.7.3.5 Perform task training.

No verification required.

F4.3.7.3.5.1 Perform payloads task training.

NA

F4.3.7.3.6 Perform function training.

No verification required.

F4.3.7.3.6.1 Perform payloads functional training.

A.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

B.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

C.   This requirement shall be verified by analysis. An analysis shall be performed of the USOC end item specification (MSFC–RQMT–1440) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.3.7 Perform operations training.

No verification required.

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level. Verification shall be considered successful when it has been shown that all end item requirements derived from this segment requirement have been successfully verified.

E.   The PICF ground–based interface for payloads shall be verified by analysis of the end item specifications and the end item activation and validation tests. The analysis shall identify those end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further confirm that the identified requirements have been verified at the end item level. Verification shall be considered successful when it has been shown that all end item requirements derived from this segment requirement have been successfully verified.

F4.3.7.18 Telescience Support Centers.

No verification required.

F4.3.7.18.1 Purpose.

No verification required.

F4.3.7.18.2 Description.

No verification required.

F4.3.7.18.3 Support on–orbit payload operations.

No verification required.

F4.3.7.18.3.1 Monitor and assess payload operations.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.3.2 Execute payload operations.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

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F4.3.7.18.3.3 Execute ground operations.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.4 Support data.

No verification required.

F4.3.7.18.4.1 Receive data.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.4.2 Prepare data for ground use.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.4.3 Distribute data on ground.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.4.4 Store data on ground.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item

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requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.5 Perform operations training.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.6 Perform Training and Certification.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.7 Access to mission support services.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

F4.3.7.18.8 Security.

This requirement shall be verified by analysis. An analysis shall be performed of the TSC end item specification (TBD) and the end item verification report to identify all of the end item requirements which, in their aggregate, comprise this segment requirement. The analysis shall further verify that each of the end item requirements derived from this segment requirement have been verified. Verification shall be considered successful when it has been shown that all of the end item requirements that equate to this segment requirement have been successfully verified.

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F4.3.8 Precedence.

No verification required.

F5. PREPARATION FOR DELIVERY.

F5.1 General.

Preservation and packaging for USGS systems, components and spares shall be designed to sustain certified performance levels and reliability margins. Each USGS system shall ensure all equipment is properly preserved, packed, and marked for transportation (if transportation is required).